

## REMARKS

In the Office Action, the Examiner rejected claims 1-5, 9-14, 16, and 18-20 under 35 U.S.C. §102(b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,947,140 to *Aardema et al.* or U.S. Patent No. 5,960,695 to *Aardema et al.* These rejections are respectfully traversed for the following reasons.

Claim 1 recites a method including, for example, estimating a flow rate through a valve based on a pressure drop and a displacement of the valve and computing a command signal to actuate the valve based on a desired flow rate and the estimated flow rate through the valve. Claim 10 recites a system including, among other elements, a flow controller coupled to a pressure sensor assembly, the flow controller being configured to estimate a flow rate through a valve based on a pressure drop and a displacement of the valve, and to determine a command signal to an actuator based on the estimated flow rate and a desired flow rate through the valve. Claim 20 recites a machine including the system of claim 10. These method, system, and machine are not taught or suggested by the cited references.

Both U.S. Patent Nos. 5,947,140 and 5,960,695 to *Aardema et al.* disclose a system for controlling an independent metering valve in a hydraulic circuit. As shown in Fig. 2 of *Aardema et al.*, the system has an independent metering valve 110, a hydraulic cylinder 120, an input device 210, and a controller 220. As illustrated in Fig. 3, the controller 220 includes a flow determinator 310, a pressure determinator 320, a pressure drop determinator 330, a displacement determinator 340, and an offset determinator 350. According to *Aardema et al.*, the controller may provide an open loop control or a closed loop control. The flow determinator 310 receives a requested

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velocity from 302 from the input device 210 and a pump flow 306 that is available to the hydraulic circuit, and it determines flows 315 based on the request velocity 302 or the pump flow 306. The pressure determinator 320 determines pressures in the hydraulic cylinder 120. The pressure drop determinator 330 determines a pressure drop 335 across each of metering valves 105. The displacement determinator 340 determines a displacement command and a corresponding actuation signal 345 for each metering valve 105 based on the flows 315, the pressure drops 335, and offsets 355.

*Aardema et al.*, however, do not teach or suggest a method including estimating a flow rate through a valve based on a pressure drop and a displacement of the valve and computing a command signal to actuate the valve based on a desired flow rate and the estimated flow rate through the valve, as required by claim 1. Nor do the references teach or suggest a system including a flow controller coupled to a pressure sensor assembly, the flow controller being configured to estimate a flow rate through a valve based on a pressure drop and a displacement of the valve, and to determine a command signal to an actuator based on the estimated flow rate and a desired flow rate through the valve, as required by claim 10 or 20.

While the claims in this application require estimating a flow rate through a valve based on a pressure drop and a displacement of the valve or a flow controller configured to estimate a flow rate through a valve based on a pressure drop and a displacement of the valve, the systems of *Aardema et al.* do not estimate a flow rate through a valve based on a pressure drop and a displacement of a valve. Instead, the systems of *Aardema et al.* determine a displacement command of a valve from a pressure drop across the valve, a requested velocity, and a pump flow. There is no

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teaching or suggestion in *Aardema et al.* to estimate a flow rate through a valve based on a displacement of the valve.

Since *Aardema et al.* fail to teach or suggest the method of claim 1, the system of claim 10, and the machine of claim 20, the rejection of those claims should be withdrawn in favor of allowance of the claims.

Claims 2-5, 9, 11-14, 16, 18, and 19 depend from one of claims 1 and 10. Therefore, claims 2-5, 9, 11-14, 16, 18, and 19 should also be allowed at least by reason of their dependency from claim 1 or 10.

In the Office Action, the Examiner rejected claims 6-8, 15, and 17 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,947,140 to *Aardema et al.* or U.S. Patent No. 5,960,695 to *Aardema et al.* This rejection is traversed.

Claims 6-8, 15, and 17 depend from claim 1 or 10. For the reasons stated above, the cited references fail to teach or suggest the subject matter of claims 1 and 10. Thus, claims 6-8, 15, and 17 should be allowed over the cited reference at least by reason of their dependency from claim 1 or 10.

Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

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Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'Naoki Yoshida', written over a horizontal line.

Dated: December 17, 2003

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